REMARKS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

The drawings had been objected to because the element "S1" in Figs. 2A and 2B had allegedly contained a typographical error. It is noted that the element "S1" is only found on Fig. 2A, not Fig. 2B. Clarification of this point is respectfully requested. Also, it is noted that element "S1" includes the following text: "CARRY TFT SUBSTRATE INTO TESTING CHAMBER AND LAY IT ON STAGE." None of these words are misspelled, nor is there anything that Applicant can determine that would be deemed improper with element "S1." The Examiner is respectfully requested to either clarify the objection and point out the specific instances and reasons for the objection, or else withdraw this objection.

The present invention is directed to a substrate testing device for testing a substrate by scanning of an electron beam across the substrate. As stated in the present "Background" section, the present invention has particular applicability in the manufacture of TFT (thin-film transistor) arrays. In the manufacture of such TFT arrays, it is routine to test the substrate panels to evaluate the individual TFT pixels. The tested result of this evaluation helps determine the location of defect positions, i.e. "bad pixels".

However, it has been found that mechanical movement and alignment of the substrate is not precise enough, and it is difficult to achieve perfect positioning of the

substrate. The present method and apparatus removes these problems by testing substrates, which may be misaligned or imperfectly positioned, without moving the misaligned substrates into perfect alignment. Rather, the present method and apparatus adjusts the scanning or testing output based upon the calculated substrate position, which is derived from the position of an alignment mark on the substrate.

The present substrate testing device includes a testing unit for acquiring a tested result by the scanning of the electron beam. An alignment mark detecting unit is provided for optically detecting an alignment mark on the substrate. A substrate position calculating unit is used for calculating a substrate position within the substrate testing device from a position of the alignment mark. A position aligning unit is provided for aligning a position of the tested result with the calculated substrate position.

The position aligning unit also converts the position of the tested result into the substrate position, and allocates the tested result to the substrate. In this way, a highly precise and accurate method and apparatus are obtained for locating defects on a TFT substrate. This is very different from the prior art relied upon by the Examiner.

Claims 1-6 stand rejected under Section 102(b) as being anticipated by Van der Werf et al. (U.S. Pat. No. 5,910,847). This rejection is respectfully traversed, particularly as applied to the claims as presently amended.

Van der Werf et al. is directed to a method of determining a radiation dose for use in a lithographic apparatus, e.g. of the type used with a mask to form patterns on an integrated circuit substrate. Van der Werf et al. discloses using alignment

marks on the mask and substrate. An optical arrangement is used with a camera and monitor and manually-controlled manipulators in order to allow a user to manually displace the substrate, so as to cause the alignment marks to coincide (col. 9, lines 35-45). Van der Werf et al. also discloses automatic alignment of the substrate where position detector signals are processed so as to drive the substrate such that the alignment marks coincide (col. 9, line 28-35).

It is clear from the disclosure of Van der Werf et al. that this device simply uses the alignment marks as a tool *to aid in moving* the substrate into alignment with the mask. Therefore, Van der Werf et al. cannot be relied upon to show a substrate testing method and apparatus, in accordance with the present invention, for correlating a tested result with a calculated substrate position such that the misaligned substrate can be accurately scanned, and such that accurate test results can be obtained on the misaligned substrate.

With reference to claim 1, Van der Werf et al. does not teach or suggest "a testing unit for acquiring a tested result of the substrate by the scanning of the electron beam," as is recited in the present claims 1 and 5. In the present invention, the testing unit applies a scanning electron beam to the substrate and receives a signal emitted from the substrate due to irradiation with the electron beam. It is noted that Van Der Werf does not teach testing a substrate, but rather is concerned with aligning a mask onto a substrate such that the substrate can be properly modified by targeted or patterned irradiation.

Further, Van der Werf et al. does not show "a substrate position calculating unit for calculating a substrate position within said substrate testing device from a position of said alignment mark." Indeed, the passage of Van der Werf et al. cited

by the Examiner as allegedly showing this detail (col. 9, line 28-35) actually teaches an optical arrangement that is used with a camera, monitor, and manually-controlled manipulators in order to allow a user to manually displace the substrate, so as to cause the alignment marks on the mask to coincide with the alignment marks on the substrate. There is no actual disclosure of "calculating a substrate position," nor can such features be inferred from Van der Werf et al. In this regard it is noted that calculating the substrate position based upon the position of the alignment mark is not necessary or contemplated as Van der Werf is only concerned with making sure the substrate and mask alignment marks coincide (via movement of the substrate relative to the mask).

Still further, Van der Werf et al. cannot be relied upon to show "a position aligning unit for aligning the tested result position with the calculated substrate position, converting the position of the tested result into the substrate position, and allocating the tested result to the substrate", as required by amended claim 1 (similar language in claim 5). The present claims clearly point to a data processing method and apparatus for converting and allocating a position of a tested result with a position of the substrate to permit testing of a misaligned substrate without the need to reposition same. The Van der Werf reference, on the other hand, teaches repositioning of the mask/substrate until they are in exact alignment. As such, by using the Van der Werf apparatus and method, there would be no need, or purpose, in aligning, converting and allocating as set forth in claim 1 (and clam 5) of the present application.

In view of the above, it is respectfully submitted that Van der Werf et al. fails to disclose "every aspect of the claimed invention" as is required in order to show

anticipation as required under Section 102 (see MPEP 706.02). Reconsideration and withdrawal of the rejections of independent claims 1 and 5 is respectfully requested. Claims 2-4 and 6 depend from claims 1 and 5, and are likewise considered allowable over the art of record. Favorable consideration of dependent claims 2-4 and 6 is therefore earnestly solicited.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. NGB-15468.

Respectfully submitted,

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